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## INTRODUCTION

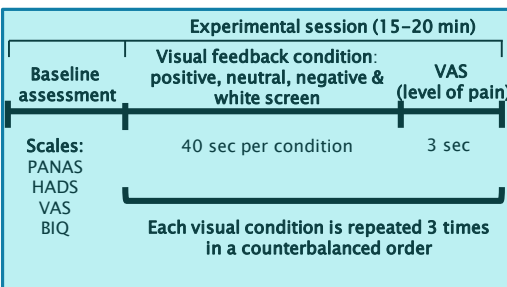
- It is common knowledge that distracting attention away from pain can diminish the subjective experience of it;
- One option to distract attention consists in using visual feedback interventions allowing the dynamic modification of the virtual body that is perceived as one's own and providing positive and relaxing feedback to the patients.
- The present study is aimed to investigate whether the exposure to different visual stimulating conditions may modulate pain perception in chronic migraine patients.**

## METHOD

We prospectively recruited 38 subjects suffering from chronic migraine (ICHD-3 criteria) at the Headache Center of the "Mondino" Institute of Pavia.

At baseline, participants were evaluated on variables psychological (Positive and Negative Affect Schedule – PANAS, Hospital Anxiety and Depression Scale – HADS), level of pain (VAS, graded from 0 to 100) and body image perception (Body Image Questionnaire – BIQ).

**Figure 1. Procedure for the baseline assessment and experimental session**



Using a visual feedback system, subjects were randomly exposed to 4 different types of facial expression: **positive** (happy/relaxed facial expression), **neutral** (neutral facial expression), **negative** (sad/distorted face) and **control** (white screen) (see Figure 2).

**Figure 2. Experimental visual feedback conditions**



Subjects were evaluated during an attack. We adopted a 1x4 within-subject study design where subjects had to observe the different visual stimuli presented 3 times in a randomized order (each condition lasted 40 seconds). After the observation of each visual condition, the level of pain was assessed using the VAS.

## CONCLUSIONS

- Our results show that a **positive visual feedback** is a stimulus strong enough to modulate pain perception via the mediation of empathy mechanisms for positive emotions.
- Our study paves the way to the integration of conventional behavioral therapy with new cognitive behavioral training based on the adoption of visual feedback to further control pain perception in chronic migraine patients.

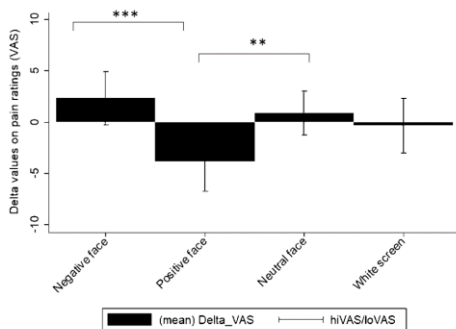
## RESULTS

**Table 1. Means and standard deviations for the baseline assessment**

	Mean	SD
Age	46.39	10.77
Female (%)	100	-
PANAS positive (10-50)	22.58	6.26
PANAS negative (10-50)	15.50	6.81
HADS depression (0-21)	7.50	4.70
HADS anxiety (0-21)	7.42	3.94
VAS (0-100)	36.29	28.93
BIQ positive (9-45)	28.13	5.23
BIQ negative (9-45)	32.84	6.18

Note: PANAS = Positive and Negative Affect Schedule; HADS = Hospital Anxiety and Depression Scale; VAS = Visual Analogue Scale; BIQ = Body Image Questionnaire.

**Figure 3. Pain ratings difference from baseline across the four conditions.**



Error bars show confidence interval values (highest and lowest values).

\*\*\*  $p < 0.001$  \*\*  $p < 0.01$

A repeated measure analyses and the following multiple comparisons by using the Scheffe test showed a significant pain decrease difference from baseline between the **positive** ( $32.4 \pm 31.0$ ) and the **negative** ( $38.6 \pm 29.7$ ) **facial expressions** ( $z = -4.46$ ,  $p < 0.001$ ), or the **positive** ( $32.4 \pm 31.0$ ) and the **neutral** ( $37.2 \pm 28.36$ ) **facial expression** ( $z = 3.41$ ,  $p = 0.009$ ). Spearman's correlation test showed a positive relationship between the negative affective state of the patients at baseline ( $15.5 \pm 6.8$ ) and the pain ratings

**References:** Valenti et al. Pain.2014. Senkowski D et al. / Neurosci. 2011. Hunter T et al., Eur J Pain; 2014

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